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§ 111.05-23 Location of ground indicators.

- Ground indicators must:
- (a) Be at the vessel's ship's service generator distribution switchboard for the normal power, normal lighting, and emergency lighting systems;
 - (b) Be at the propulsion switchboard for propulsion systems; and
 - (c) Be readily accessible.
- (d) Be provided (at the distribution switchboard or at another location, such as a centralized monitoring position for the circuit affected) for each feeder circuit that is isolated from the main source by a transformer or other device.

NOTE TO PARAGRAPH (d): An alarm contact or indicating device returned to the main switchboard via a control cable, that allows the detecting equipment to remain near the transformer or other isolating device for local troubleshooting, is allowed.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28276, June 4, 1996; 62 FR 23907, May 1, 1997]

§ 111.05-25 Ungrounded systems.

Each ungrounded system must be provided with a suitably sensitive ground detection system located at the respective switchboard which provides continuous indication of circuit status to ground with a provision to momentarily remove the indicating device from the reference ground.

[CGD 94-108, 61 FR 28276, June 4, 1996]

§ 111.05-27 Grounded neutral alternating current systems.

Grounded neutral and high-impedance grounded neutral alternating current systems must have a suitably sensitive ground detection system which indicates current in the ground connection, is able to withstand the maximum available fault current without damage, and provides continuous indication of circuit status to ground. A provision must be included to compare indications under fault conditions with those under normal conditions.

[CGD 94-108, 62 FR 23907, May 1, 1997]

§ 111.05-29 Dual voltage direct current systems.

Each dual voltage direct current system must have a suitably sensitive

ground detection system which indicates current in the ground connection, has a range of at least 150 percent of neutral current rating and indicates the polarity of the fault.

[CGD 94-108, 61 FR 28276, June 4, 1996]

GROUNDING CONDUCTORS

§ 111.05-31 Grounding conductors for systems.

- (a) A conductor for grounding a direct-current system must be the larger of:
- (1) The largest conductor supplying the system; or
 - (2) No. 8 AWG (8.4mm²).
- (b) A conductor for grounding the neutral of an alternating-current system must meet Table 111.05-31(b).

TABLE 111.05-31(b)—NEUTRAL GROUNDING CONDUCTOR FOR ALTERNATING-CURRENT SYSTEM

Size of the largest generator cable or equivalent for parallel generators—AWG-MCM (mm ²)		Size of the system grounding conductor—AWG(mm ²)
Greater than	Less than or equal to	
.....	2 (33.6)	8 (8.4)
2 (33.6)	0 (53.5)	6 (13.3)
0 (53.5)	3/0 (85.0)	4 (21.2)
3/0 (85.0)	350 MCM (177)	2 (33.6)
350 MCM (177)	600 MCM (304)	0 (53.5)
600 MCM (304)	1100 MCM (557)	2/0 (67.5)
1100 MCM (557)	3/0 (85.0)

§ 111.05-33 Equipment safety grounding (bonding) conductors.

- (a) Each equipment grounding conductor must be sized in accordance with article 250-95 of the National Electrical Code (the NEC) (NFPA 70).
- (b) Each equipment grounding conductor (other than a system grounding conductor) of a cable must be permanently identified as a grounding conductor in accordance with the requirements of article 310-12(b) of the NEC.

[CGD 94-108, 61 FR 28276, June 4, 1996, as amended at 62 FR 23907, May 1, 1997]

§ 111.05-37 Overcurrent devices.

- (a) A permanently grounded conductor must not have an overcurrent device unless the overcurrent device simultaneously opens each ungrounded conductor of the circuit.
- (b) The neutral conductor of the emergency-main switchboard bus-tie

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must not have a switch or circuit breaker.

[CGD 94-108, 61 FR 28276, June 4, 1996]

Subpart 111.10—Power Supply

§ 111.10-1 Definitions.

As used in this Subpart:

(a) *Ships's service loads* mean electrical equipment for all auxiliary services necessary for maintaining the vessel in a normal, operational and habitable condition. Ship's service loads include, but are not limited to, all safety, lighting, ventilation, navigational, communications, habitability, and propulsion auxiliary loads. Electrical propulsion motor, bow thruster motor, cargo transfer, drilling, cargo refrigeration for other than Class 5.2 organic peroxides and Class 4.1 self-reactive substances, and other industrial type loads are not included.

(b) *Drilling loads* means all loads associated exclusively with the drilling operation including power to the drill table, mud system, and positioning equipment.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28276, June 4, 1996; 62 FR 23907, May 1, 1997]

§ 111.10-3 Two generating sources.

In addition to the emergency power sources required under part 112 of this chapter, each self-propelled vessel and each mobile offshore drilling unit must have at least two electric generating sources.

[CGD 94-108, 61 FR 28276, June 4, 1996]

§ 111.10-4 Power requirements, generating sources.

(a) The aggregate capacity of the electric ship's service generating sources required in § 111.10-3 must be sufficient for the ship's service loads.

(b) With the ship's service generating source of the largest capacity stopped, the combined capacity of the remaining electric ship's service generating source or sources must be sufficient to supply those services necessary to provide normal operational conditions of propulsion and safety, and minimum comfortable conditions of habitability. Habitability services include cooking, heating, air conditioning (where in-

stalled), domestic refrigeration, mechanical ventilation, sanitation, and fresh water.

(c) The capacity of the ship's service generating sources must be sufficient for supplying the ship's service loads without the use of a generating source which is dependent upon the speed or direction of the main propelling engines or shafting.

(d) Operating generators must provide a continuous and uninterrupted source of power for the ship's service load under normal operational conditions. Any vessel speed change or throttle movement must not cause a ship's service load power interruption.

(e) Vessels with electric propulsion that have two or more constant-voltage generators which supply both ship's service and propulsion power do not need additional ship's service generators provided that with any one propulsion/ship's service generator out of service the capacity of the remaining generator(s) is sufficient for the electrical loads necessary to provide normal operational conditions of propulsion and safety, and minimum comfortable conditions of habitability.

(f) A generator driven by a main propulsion unit (such as a shaft generator) which is capable of providing electrical power continuously, regardless of the speed and direction of the propulsion shaft, may be considered one of the ship's service generating sets required by § 111.10-3. A main-engine-dependent generator which is not capable of providing continuous electrical power may be utilized as a supplemental generator provided that a required ship's service generator or generators having sufficient capacity to supply the ship's service loads can be automatically brought on line prior to the main-engine-dependent generator tripping off-line due to a change in the speed or direction of the main propulsion unit.

[CGD 94-108, 61 FR 28277, June 4, 1996; 61 FR 36787, July 12, 1996]

§ 111.10-5 Multiple energy sources.

Failure of any single generating set energy source such as a boiler, diesel, gas turbine, or steam turbine must not cause all generating sets required in § 111.10-3 to be inoperable.